

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/041069 A3

(51) International Patent Classification⁷: A61N 1/08

(21) International Application Number:
PCT/US2003/034789

(22) International Filing Date:
3 November 2003 (03.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/422,870 1 November 2002 (01.11.2002) US

(71) Applicant (for all designated States except US):
GEORGE MASON INTELLECTUAL PROPERTIES, INC. [US/US]; Office of Technology Transfer,
MSN-5G5, 4400 University Drive, Fairfax, VA 22030
(US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GLUCKMAN,**

Bruce, J. [US/US]; 925 N. Danville Street, Arlington, VA 22201 (US). **RICHARDSON, Kristen, A.** [US/US]; 4400 University Drive, Fairfax, VA 22030 (US). **WEINSTEIN, Steven, L.** [US/US]; 111 Michigan Avenue, NW, Washington, DC 20010 (US). **SCHIFF, Steven, J.** [US/US]; 4821 Wellington Drive, Chevy Chase, MD 20815 (US).

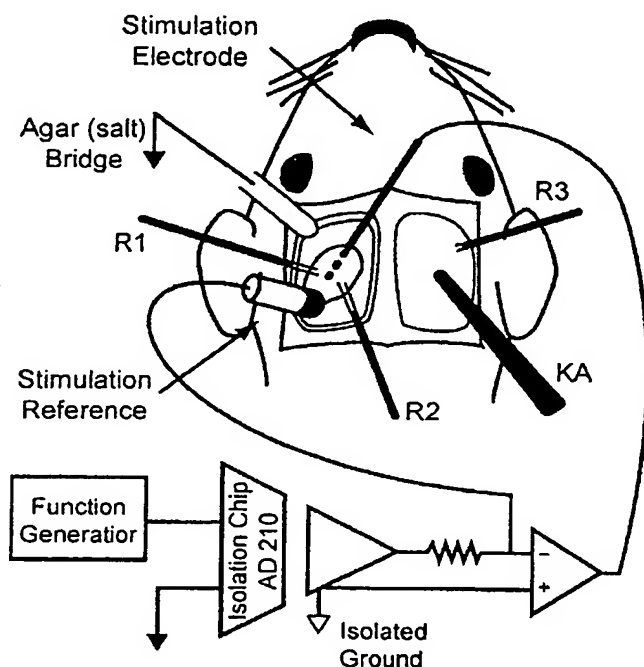
(74) Agents: **LEBOVITZ, Richard, M.** et al.; Millen, White, Zelman & Branigan, P.C., Arlington Courthouse Plaza 1, Suite 1400, 2200 Clarendon Boulevard, Arlington, VA 22201 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: METHODS AND DEVICES FOR DETERMINING BRAIN STATE



(57) Abstract: The present invention relates to methods and devices for determining the state of a neural system. In one embodiment, a plurality of stimuli to the system can be delivered to the system, and then the resulting respective responses (R1, R2, R3) can be analyzed to determine whether the system state is static, or whether it is undergoing dynamic changes. In another aspect of the invention, a single stimulus having a plurality of components can be administered, and the responses to each component can be contrasted and compared to determine the state of the neural system. In each case, this information can be used to predict the occurrence of neural perturbations or episodes associated with a change in the state of the neural system.

(88) Date of publication of the international search report:
15 July 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference GMU-0007-WO	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/US03/34789	International filing date (day/month/year) 03 November 2003 (03.11.2003)	(Earliest) Priority Date (day/month/year) 01 November 2002 (01.11.2002)
Applicant GEORGE MASON UNIVERSITY		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 1

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures

PCT/US03/34789

NEW ABSTRACT

FD-302 (Rev. 11-29-70) (continuation of first sheet(2)) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/34789

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61N 1/08

US CL : 607/45

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 607/045, 002

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,363,279 B1 (BEN-HAIM et al.) 26 March 2002 (26.03.2002). See column 2, line 52 - column 3, line 22; column 8, lines 1-18; column 24, lines 49-61; column 25, lines 43-48; column 26, lines 50-67.	1-23 and 25-28
Y, E	US 6,665,562 B2 (GLUCKMAN et al.) 16 December 2003 (16.12.2003). See column 2, lines 5-39.	24

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"A" document member of the same patent family

Date of the actual completion of the international search

02 May 2004 (02.05.2004)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Date of mailing of the international search report

24 MAY 2004

Authorized officer

Angela D. Sykes

Telephone No. (703) 308-0858